

## Features

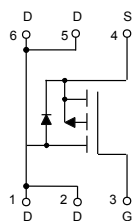
- Low  $R_{DS(ON)}$
- Epoxy Meets UL 94 V-0 Flammability Rating
- Moisture Sensitivity Level 1
- Halogen Free Available Upon Request By Adding Suffix "-HF"
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

## Maximum Ratings

- Operating Junction Temperature Range:  $-55^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$
- Storage Temperature:  $-55^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$
- Thermal Resistance:  $62.5^{\circ}\text{C/W}$  Junction to Ambient<sup>(Note 1)</sup>

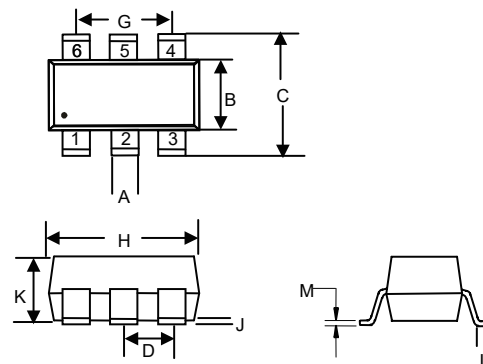
| Parameter                | Symbol   | Rating   | Unit |
|--------------------------|----------|----------|------|
| Drain -source Voltage    | $V_{DS}$ | -20      | V    |
| Gate -Source Voltage     | $V_{GS}$ | $\pm 10$ | V    |
| Drain Current-Continuous | $I_D$    | -5.4     | A    |
| Power Dissipation        | $P_D$    | 2.0      | W    |

## Internal Structure



## P-Channel MOSFET

### SOT23-6L



| DIMENSIONS |           |       |          |      |      |
|------------|-----------|-------|----------|------|------|
| DIM        | INCHES    |       | MM       |      | NOTE |
|            | MIN       | MAX   | MIN      | MAX  |      |
| A          | 0.012     | 0.020 | 0.30     | 0.50 |      |
| B          | 0.051     | 0.070 | 1.30     | 1.80 |      |
| C          | 0.087     | 0.126 | 2.20     | 3.20 |      |
| D          | 0.037 BSC |       | 0.95 BSC |      |      |
| G          | 0.074 BSC |       | 1.90 BSC |      |      |
| H          | 0.106     | 0.122 | 2.70     | 3.10 |      |
| J          | 0.002     | 0.006 | 0.05     | 0.15 |      |
| K          | 0.030     | 0.051 | 0.75     | 1.30 |      |
| L          | 0.012     | 0.024 | 0.30     | 0.60 |      |
| M          | 0.003     | 0.008 | 0.08     | 0.22 |      |

**ELECTRICAL CHARACTERISTICS (Ta=25°C unless otherwise specified)**

| Parameter                                          | Symbol               | Test conditions                                                                                                | Min  | Typ  | Max  | Unit |
|----------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------------------------|------|------|------|------|
| Static Characteristics                             |                      |                                                                                                                |      |      |      |      |
| Drain-Source Breakdown Voltage                     | V <sub>(BR)DSS</sub> | V <sub>GS</sub> =0V, I <sub>D</sub> =-250μA                                                                    | -20  |      |      | V    |
| Gate-Threshold Voltage                             | V <sub>GS(th)</sub>  | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA                                                      | -0.5 |      | -0.9 | V    |
| Gate-Body Leakage Current                          | I <sub>GSS</sub>     | V <sub>GS</sub> =±8V, V <sub>DS</sub> =0V                                                                      |      |      | ±100 | nA   |
| Zero Gate Voltage Drain Current                    | I <sub>DSS</sub>     | V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V                                                                     |      |      | -1   | μA   |
| Drain-Source On-Resistance <sup>(Note 2)</sup>     | R <sub>DS(on)</sub>  | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-2.7A                                                                  |      | 35   | 60   | mΩ   |
|                                                    |                      | V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-2.7A                                                                  |      | 46   | 80   |      |
|                                                    |                      | V <sub>GS</sub> =-1.8V, I <sub>D</sub> =-2.7A                                                                  |      | 90   |      |      |
| Forward Tranconductance <sup>(Note 2)</sup>        | g <sub>FS</sub>      | V <sub>DS</sub> =-5V, I <sub>D</sub> =-4.1A                                                                    | 6    |      |      | S    |
| Dynamic Characteristics                            |                      |                                                                                                                |      |      |      |      |
| Input Capacitance <sup>(Note 1,3)</sup>            | C <sub>iss</sub>     | V <sub>DS</sub> =-4V,V <sub>GS</sub> =0V, f=1MHz                                                               |      | 740  |      | pF   |
| Output Capacitance <sup>(Note 1,3)</sup>           | C <sub>oss</sub>     |                                                                                                                |      | 290  |      |      |
| Reverse Transfer Capacitance <sup>(Note 1,3)</sup> | C <sub>rss</sub>     |                                                                                                                |      | 190  |      |      |
| Total Gate Charge <sup>(Note 1)</sup>              | Qg                   | V <sub>DS</sub> =-4V,V <sub>GS</sub> =-4.5V,I <sub>D</sub> =-4.1A                                              |      | 7.8  | 15   | nC   |
|                                                    |                      | V <sub>DS</sub> =-4V,V <sub>GS</sub> =-2.5V,I <sub>D</sub> =-4.1A                                              |      | 4.5  | 9    |      |
| Gate-Source Chage <sup>(Note 1)</sup>              | Qgs                  |                                                                                                                |      | 1.2  |      |      |
| Gage-Drain Charge <sup>(Note 1)</sup>              | Qgd                  |                                                                                                                |      | 1.6  |      |      |
| Gate Resistance <sup>(Note 1,3)</sup>              | Rg                   | f=1MHz                                                                                                         | 1.4  | 7    | 14   | Ω    |
| Turn-On Delay Time <sup>(Note 1,3)</sup>           | t <sub>d(on)</sub>   | V <sub>DD</sub> =-4V,V <sub>GEN</sub> =-4.5V,R <sub>L</sub> =1.2Ω,<br>I <sub>D</sub> =-3.3A,R <sub>G</sub> =1Ω |      | 13   | 20   | ns   |
| Turn-On Rise Time <sup>(Note 1,3)</sup>            | t <sub>r</sub>       |                                                                                                                |      | 35   | 53   |      |
| Turn-Off Delay Time <sup>(Note 1,3)</sup>          | t <sub>d(off)</sub>  |                                                                                                                |      | 32   | 48   |      |
| Turn-Off Fall Time <sup>(Note 1,3)</sup>           | t <sub>f</sub>       |                                                                                                                |      | 10   | 20   |      |
| Turn-On Delay Time <sup>(Note 1,3)</sup>           | t <sub>d(on)</sub>   | V <sub>DD</sub> =-4V,V <sub>GEN</sub> =-8V,R <sub>L</sub> =1.2Ω,<br>I <sub>D</sub> =-3.3A,R <sub>G</sub> =1Ω   |      | 5    | 10   | ns   |
| Turn-On Rise Time <sup>(Note 1,3)</sup>            | t <sub>r</sub>       |                                                                                                                |      | 11   | 17   |      |
| Turn-Off Delay Time <sup>(Note 1,3)</sup>          | t <sub>d(off)</sub>  |                                                                                                                |      | 22   | 33   |      |
| Turn-Off Fall Time <sup>(Note 1,3)</sup>           | t <sub>f</sub>       |                                                                                                                |      | 16   | 24   |      |
| Drain-Source Body Diode Characteristics            |                      |                                                                                                                |      |      |      |      |
| Continuous Source-Drain Diode Current              | I <sub>S</sub>       | T <sub>C</sub> =25°C                                                                                           |      |      | -4.2 | A    |
| Pulse Diode Fforward Current <sup>(Note 2)</sup>   | I <sub>SM</sub>      |                                                                                                                |      |      | -10  |      |
| Body Diode Voltage                                 | V <sub>SD</sub>      | I <sub>F</sub> =-3.3A                                                                                          |      | -0.8 | -1.2 | V    |

Note:

1. Guaranteed by Design, Not Subject to Production Testing.
2. Pulse Test: Pulse Width $\leq 300\mu s$ , Duty Cycle $\leq 2\%$ .
3. These Parameters Have No Way to Verify.

## Curve Characteristics

Fig. 1 - On-Resistance Characteristics

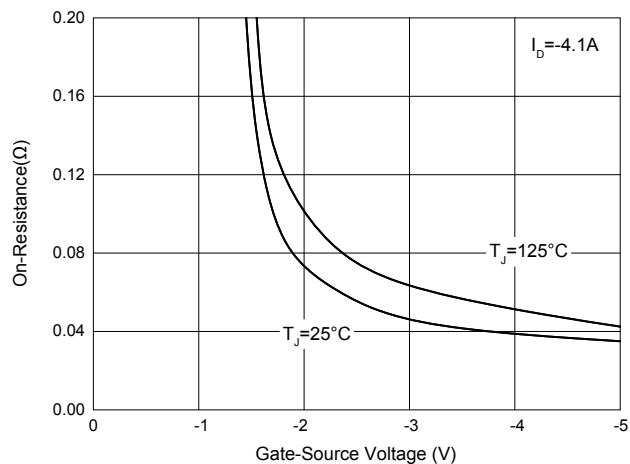


Fig. 2 - Drain Current Characteristics

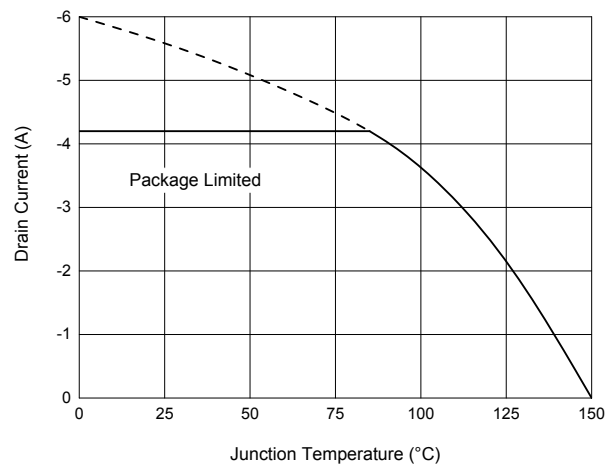


Fig. 3 - Output Characteristics

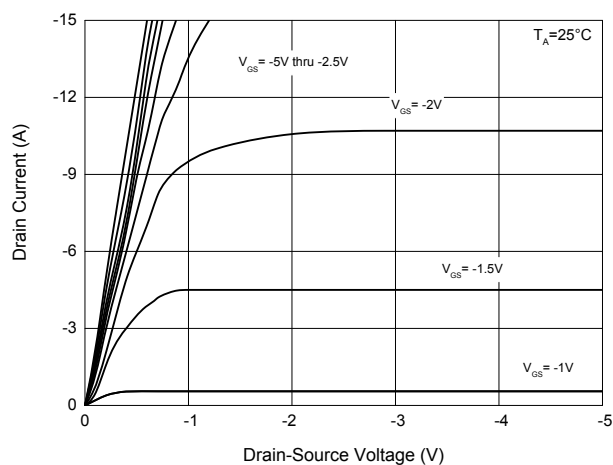
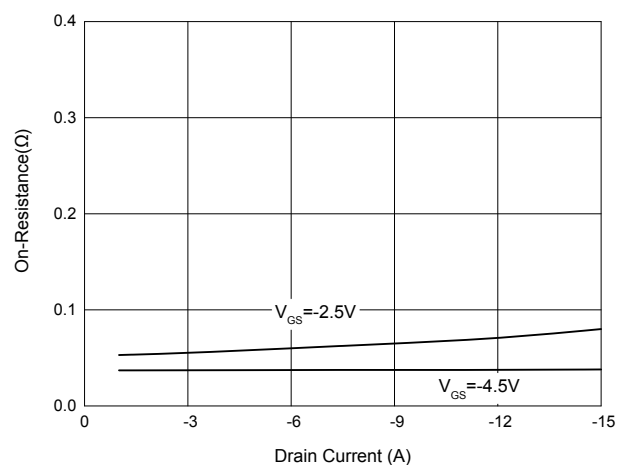


Fig. 4 - On-Resistance Characteristics



## Ordering Information

| Device         | Packing              |
|----------------|----------------------|
| Part Number-TP | Tape&Reel:3Kpcs/Reel |

Note : Adding "-HF" Suffix For Halogen Free, eg. Part Number-TP-HF

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